Centre for Advanced Study

CAS OSLO

Newsletter no. 2 • October 2004 • 12th year

Knowledge can cure ADHD

■ Between three and five per cent of all boys, and not quite so many girls, are born with brains that produce too little of the transmitter substance dopamine. The result may be the psychiatric disorder ADHD, which represents an increased risk of drug abuse and crime later in life. Professor Terje Sagvolden (photo) is heading an international research group whose aim is to collect and systematise today's knowledge about ADHD. Among other things the researchers are to look at the possibility of developing a tool that can identify ADHD children at an early stage so that they can receive treatment.

● Pages 2–3

Language researchers meeting biologists

■ Modern linguists often compare their own subject with physics or biology, something that can send cold shudders running down the backs of more humanistically oriented linguists. But we cannot ignore the fact that biology in particular offers many models and metaphors than can be used in linguistics.

● Pages 6–7

The Centre seeks proposals for group leaders for 2007/2008

The Centre for Advanced Study organises basic and interdisciplinary research on a high international level. In December this year the Board will be evaluating candidates to head research groups that are to spend one year at the Centre in the research year 2007/2008.

The group leaders are chosen from among leading Norwegian researchers within the fields of the humanities/theology, natural science/mathematics/medicine, and social science/law. The groups are to have an international composition, and will be fully funded by the Centre in co-operation with the four Norwegian universities, the Agricultural University of Norway and the Norwegian School of Economics and Business Administration.

The Centre is now asking for proposals for candidates to serve as leaders. Proposals should include:

- The name(s) of the candidate(s), with place of work and CV
- A brief description of the research group's subject and central issues to be dealt with by the project

More information is available on our Web pages: www.cas.uio.no.
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The closing date for the submission of proposals is Friday 19 November 2004.

EDITORIAL

New members of the CAS family

When the CAS was established in 1989, the Centre was to serve as a common arena for the best basic researchers at the four Norwegian universities. The objective was to enhance the quality of Norwegian basic and interdisciplinary research and to raise it to the highest international level. The co-operation with the four universities was formalised through agreements that provide outstanding university researchers with an extraordinary period of research leave and favourable funding based on a thorough international evaluation. Only one criterion shall be applied for the selection of researchers and projects: *Academic quality*.

In July this year the CAS signed corresponding co-operation agreements with the Agricultural University of Norway (NLH) and the Norwegian School of Economics and Business Administration (NHH), which for many years have been demonstrating quality and weight in their basic and interdisciplinary research. This means that from and including the academic year 2007/08 NHH and NLH are taking part in keener competition for what the Centre has to offer.

It is interesting to note that the CAS' co-operating partners, whose institutions together house 11 of the Norwegian Research Council's 13 Centres of Excellence (CoE), do not see any clash of interests between these centres and the co-operation with the CAS. The objective is the same: *To give elite researchers elite conditions*, but the differences in methods of approach are striking. The CAS has permanent existence and a thematic profile that changes from year to year within several research fields with a disciplinary and interdisciplinary orientation; the CoEs have for their part a limited existence (5–10 years) and a clearly defined academic profile within *one* field of research with disciplinary anchorage. The Norwegian authorities have thus seen that many roads lead to Rome, and that the probability of reaching one's destination increases with the number of roads one builds.

The conditions are therefore right for a partnership between the CoEs and the CAS with a view to uniting "Basic Research Norway into one kingdom", through co-ordination of resources, efforts and results. The CAS is willing to enter into such co-operation for the purpose of further enhancing the quality of the basic research being conducted by its co-operating partners.

Willy Østreng
Scientific Director, CAS

ADHD: The scourge of our time?

ADHD is the most widespread and hereditary psychiatric disorder that is known, and without treatment it often leads to criminal careers or other personal tragedies. "There's a great need for a better understanding of the fundamental mechanisms behind ADHD. It's a short distance from basic research to better diagnoses and treatment," says Professor Terje Sagvolden.

Between three and five per cent of all boys, and not quite so many girls, have brains that produce too little of the neurotransmitter dopamine. This substance plays an important role in the processes of learning and memory, and an imbalance in the dopamine system can have enormous consequences both for the boy or girl concerned and for society as a whole.

"The Norwegian psychologist Kirsten Rasmussen has determined that as many as 30 per cent of the male inmates in Norwegian prisons have ADHD, and there's reason to believe that similar circumstances prevail in other countries too. ADHD children have a strong tendency to come into conflict with the law if they're not diagnosed and treated," says Professor Terje Sagvolden.

The statistics also show that children with ADHD are at greater risk of becoming drug abusers, they often have learning difficulties, and as adults they have on average lower incomes and lower status than their intelligence and other abilities would indicate. "They're also more prone to car accidents, they have a greater degree of absence on account of sickness, and they have more periods of depression. In developing countries we're afraid that those affected by ADHD contribute to the spread of HIV and AIDS because they're generally impulsive and have difficulty in seeing the consequences of their own actions. It's quite simply a serious personal disorder and a great social problem, which unfortunately has not yet been well enough understood," says Professor Sagvolden.

Interdisciplinary research

Professor Sagvolden, who often uses the strip cartoon terror, *Dennis the Menace*, as an illustration when he gives lectures on his ADHD research, is now heading an interdisciplinary research group with mathematicians, medical specialists, psychologists and neurobiologists at the CAS. The group's aim is to collect and systematise today's knowledge about ADHD with a view to developing new theories and hypotheses that can be empirically tested. "There're thousands of research reports in this field, but little has been done to systematise this knowledge," Terje Sagvolden relates.

Professor Sagvolden certainly has what is needed to lead an interdisciplinary and international research group in this field: He is interdisciplinary himself and is conducting neurobiological research in the border zone between psychology and biology, in addition to the fact that he has been active in a number of international research organisations over many years. Terje Sagvolden's interest in the connection between ADHD and the occurrence of HIV and AIDS springs inter alia

Attention-Deficit/Hyperactivity Disorder (ADHD) from genes to therapy

■ The most important aim of the research group "Attention-Deficit/Hyperactivity Disorder (ADHD) from genes to therapy" is to build a bridge between basic research and the clinical understanding of ADHD, which is the most frequently occurring psychiatric disorder in children. The group will attempt to take advantage of the good Norwegian research community in neurobiology. This is the first time an international interdisciplinary group of researchers has come together for a lengthy period of time in order to try to arrive at an integrated understanding, perhaps model or theory, of ADHD.

Deeper insight into ADHD may constitute the foundation not only for future diagnoses and treatment of the disorder, but also for future basic research, and perhaps for mathematical models which will again contribute to making diagnosis and treatment even better.

The group is headed by Professor Terje Sagvolden in the Institute of Basic Medical Sciences at the University of Oslo.

Interdisciplinary and international ADHD researchers: Front row, from left. Peter Killeen, Arizona State University; Jonathan Williams, University of London; Gail Tripp, University of Otago, New Zealand.
Behind from left. Terje Sagvolden; Espen Borgå Johansen, University of Oslo; Jeff Wickens, University of Otago.

from his role of adviser to the Society for Neuroscientists in Africa (SONA).

"There's much to suggest that the occurrence of ADHD is on the increase in western countries at the present time, and this is also a question we want to have a closer look at. ADHD is largely hereditary, but it's difficult to believe that the genes that are involved are in the process of spreading. On the other hand it's been shown that certain types of chemicals, such as the PCBs, can cause changes in the neurochemistry of the brain and possibly trigger ADHD," says Terje Sagvolden.

Professor Sagvolden's suspicions have also been directed at Rotenone, which has been used to eradicate undesirable species of fish in Norway since the 1950s and the salmon parasite *Gyrodactylus salaris* since 1981. It is known that Rotenone can cause Parkinson-like symptoms in rats, while the effects on humans have not been investigated. "These should have been investigated before anybody started using Rotenone and spraying pesticides that have similar effects on the nervous system, on a large scale," Professor Sagvolden says.

ADHD can be treated

The good news is that ADHD can be treated with good results. Children with ADHD who come for treatment at an early stage have no increased risk of becoming drug abusers. But among those who do not receive treatment, roughly 40 per cent develop into abusers.

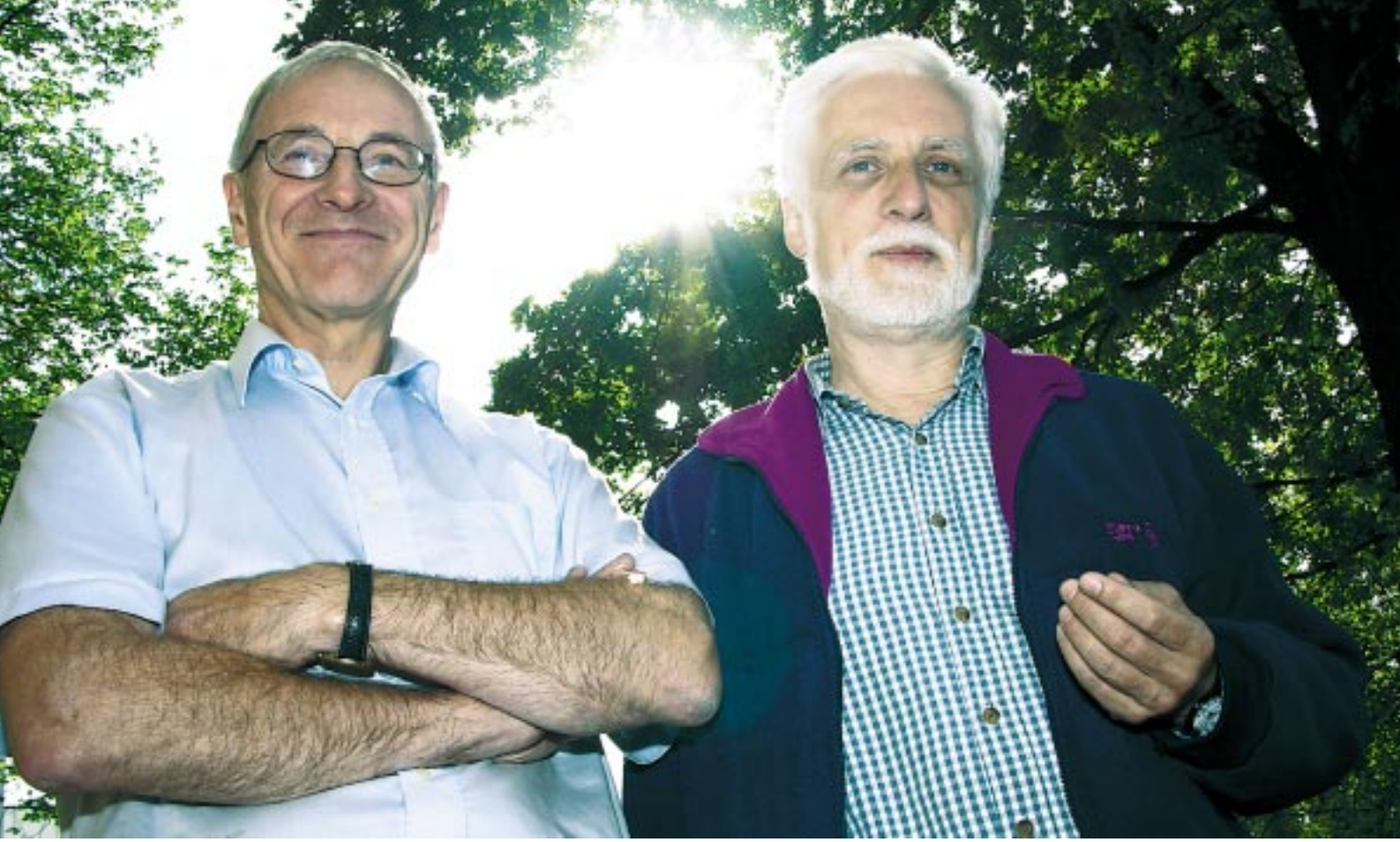
ADHD is treated medically with the central nervous system stimulants amphetamine and methylphenidate, with Ritalin and Concerta as the most well known and widely used preparations. "Parents are often afraid of giving amphetamine or methylphenidate to their children, but here it's important to note that abuse is a matter of doses that are 30–40 times higher than the clinical doses, and are taken in other ways than these medicines. The development of drug addiction results from a rapid increase in the dopamine level in the brain, while correct medication gives a much slower release of dopamine. The latter doesn't create dependence. Early treatment of ADHD children to some degree normalises their brain chemistry and thereby reduces much of their desire to seek out communities of drug abusers," Professor Sagvolden explains.

Basic research and a new diagnosis

The CAS researchers are among other things to take a closer look at whether it is theoretically possible to develop a method of diagnosis that is based on computer or video games. "A new method of diagnosis ought to be simple and cheap to use, so that it can also be used in poor countries where HIV and AIDS are major problems," Terje Sagvolden emphasises.

The transmitter substance dopamine influences the processes of memory and learning in the brain, where the mechanism is that dopamine is liberated as a kind of chemical reward or reinforcement. ADHD patients do not produce sufficient amounts of dopamine and therefore experience a less satisfactory reward, something that again leads to the fact that the long lines of the learning process are weakened. The low dopamine level also leads to ADHD children's being susceptible to using drugs that can increase the level of dopamine.

Today there is no blood or urine test that can be used to diagnose ADHD. "ADHD is diagnosed instead through behavioural tests and clinical judgement, and the diagnosis is constantly being refined. In ADHD children what has "just happened" is much more important than for children with normal dopamine regulation, who are better at concentrating over lengthy periods of time. This can probably be tested by seeing how children solve different problems in specially developed computer games," he says.



Turbulence is the root of all life

Turbulence is the root of all life – at any rate in the sea. Jan Trulsen and Hans L. Pécseli explain that without turbulence, parts of the food chain in the sea would more or less collapse. On the other hand the communications satellites in geostationary orbit would be considerably safer without this phenomenon.

At first glance it might seem a bit narrow to study "Turbulence in plasmas and fluids", which is the title of the research project headed by Professors Jan Trulsen and Hans L. Pécseli at the CAS in 2004–2005. But at second glance turbulence concerns a really large number of related phenomena, both on the Earth and in the rest of the Universe. In addition to possibly being a necessary condition for life in the oceans, the phenomenon of turbulence is absolutely crucial to such different things as the spreading of pollutants in the atmosphere and the possibility of constructing a fusion power station.

"Turbulence is a very extensive subject, with masses of unsolved problems for researchers, but in this project we have basically limited ourselves to two fields: Turbulent transport and the significance of turbulence for the electrical conductivity of a plasma," says Professor Trulsen. "When it comes to plasmas (ionised gases), this physical state is relatively rare as a natural state on the Earth. But, more generally, in the Universe plasmas account for more than 99.9 per cent of the total mass."

The turbulent life in the sea

Turbulence is a very effective and important transport mechanism in the oceans and in the atmosphere. If the atmosphere had always been at rest, one could simply have gathered the pollutants beneath the factory chimneys by the end of a day – but instead the pollutants are rapidly spread over great distances via turbulence. As far as life in the oceans is concerned, turbulence has enormous importance for the smallest organisms' capacity to survive. Both fish larvae and the plankton organisms on which they live, have virtually no self-locomotion –

Turbulence in plasmas and fluids

Turbulence in fluids and plasmas is one of the least understood topics in physics. In spite of considerable progress in the study of neutral currents, for example in water, there are still a number of fundamental problems that have not been understood. When it comes to turbulence in plasmas, the situation is even more unfavourable.

Turbulent fluctuations in gases and fluids have a capacity to spread (disperse) particles at an abnormally high rate, and in plasmas turbulence is crucial to, for instance, the electrical conductivity. The research group will be working with selected central questions relating to turbulent transport, with the emphasis on applications in Nature. The project is being headed by Professor Jan Trulsen from the Department of Astrophysics and Professor Hans L. Pécseli from the Department of Physics at the University of Oslo.

The phenomenon of turbulence is absolutely crucial to such different things as life in the sea, the spreading of pollutants in the atmosphere, and the possibility of constructing a fusion power station. The illustration shows a "jet" injected into water, developing into a turbulent state.

"One of the objectives of the work in this group is to create a joint forum for biologists and physicists with different angles of approach to the phenomenon of turbulence," say Jan Trulsen (left) and Hans L. Pécseli. In the background: The Sun with both plasma and turbulence.

they are in other words not capable of swimming more than very short distances. "This means that a small organism that finds itself in still or calmly flowing waters will rapidly exhaust its immediate area of food and begin to starve. On the other hand, if the flow is turbulent, the masses of water are effectively mixed and then a new organism will constantly come within the reach of the fish larvae," Professor Trulsen explains. Turbulence is therefore crucial to the survival of the smallest organisms, and without the smallest ones the entire food chain in the oceans would have broken down. "Or the microorganisms would have to swim in order to survive, but that will be at the expense of energy, of course", Professor Pécseli adds.

The electrical solar system

The second main field – turbulence and the electrical conductivity of plasmas – is of significance for, among other things, the solar wind, which can put both satellites and the power grid on the surface of the Earth out of action, and for the researchers striving to develop a fusion reactor.

"The Sun emits a constant stream of electrons and ions – a plasma – that is called the solar wind. Normally we are well protected by the Earth's magnetic field, which ensures that the solar wind does not manage to force its way farther down than a distance of roughly 15 Earth radii. But in periods of strong solar wind activity, the magnetic field can be pressed together to a distance of about 10 Earth radii, and on a number of occasions this has led to satellites in high orbits being knocked out of action. These episodes also lead to the fact that disturbances in the Earth's magnetic field can get right down to the surface of the polar areas, and then great damage can arise, for example, when electrical currents are induced in major power lines. The best known example is from Canada in 1989, when an unusually violent geomagnetic storm caused six million consumers to lose their electricity for almost twenty-four hours," Professor Pécseli relates.

One reason that the solar wind, consisting of free electrons and ions, can cause such events is that a violent solar wind can turn large parts of the inner solar system into a gigantic electrical conductor. "The solar wind can have just as good electrical conductivity as a copper wire," explains Professor Pécseli. "And it's essentially the degree of turbulence in the solar wind that decides how great the electrical conductivity becomes."

Turbulence and the fusion reactor

Problems related to turbulence phenomena are also an important reason why researchers have still not managed to build a functioning fusion reactor after more than 50 years of effort. "The fusion reactor, as it's called, which releases energy by fusing ("uniting") atoms, requires temperatures of up to about 100 million degrees in the fusion material. This material is kept in place in the reactor by means of a sort of magnetic "bottle", but if particles at a temperature of several million degrees should break out of their magnetic confinement and come into contact with the physical wall of the reactor chamber, this wall would immediately evaporate. So it's extremely important to avoid turbulence phenomena and the associated turbulent transport of particles across magnetic field lines," explains Professor Trulsen. Discussions are now taking place internationally concerning the location of a new generation of reactors of a sufficient size to solve the problem.

Uniting biologists and physicists

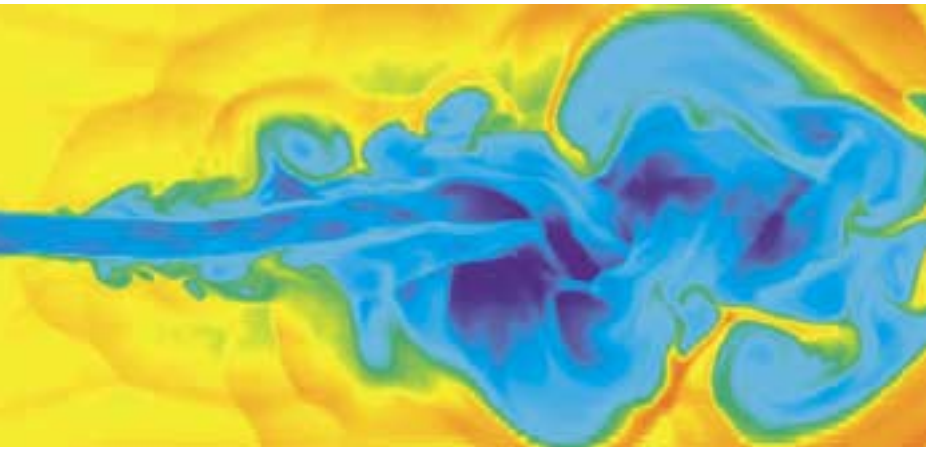
The examples of life in the sea, the solar wind and the fusion reactor show that there are many good reasons for developing more detailed knowledge about turbulence. Jan Trulsen and Hans L. Pécseli, who have been co-operating on turbulence research for more than a generation, are hoping to be able to take a long step forward in the basic understanding of the phenomena that are to be studied in the course of one year at the CAS. "Here we've been given extremely good overall conditions that will provide us with the opportunity to intensify our research, and we shall be laying a foundation for continuing greater efforts afterwards, with great emphasis on Nordic co-operation. One of our objectives is to create a joint forum for biologists and physicists with different angles of approach to the phenomenon of turbulence," says Professor Pécseli.

Biologists and physicists are two groups of researchers who have traditionally stood far apart, both academically and at times culturally. "But at the same time we can see an increasing number of examples of physicists' taking the step across to biology, and of biologists becoming major consumers of computer power and mathematical models. So it is really time that we became better acquainted with one another," Professor Trulsen believes.

Concerned

Jan Trulsen and Hans L. Pécseli are incidentally very concerned about recruitment to the natural sciences, which is on the wane both in Norway and in large parts of the western world otherwise. "In principle, a society can manage with rather few technologists, but this can have unfortunate consequences. Among other things we risk that other countries, which invest much more in technology, outstrip us in the long run. What's more, strong technological communities will also give us better technologies. If more people had the same competence as Bill Gates, we should quite certainly have had more and better operating systems to choose between than we have today," says Professor Pécseli.

"It's also a great problem that the recruitment of teachers to the lower secondary schools is poor in the science subjects, and it's been so for many years. Who is to stimulate young people's interest in science subjects, if it's not the teachers," asks Professor Trulsen.



This is plasma

A plasma can be described as a gas to which has been energized so that first the molecules and then the atoms are split into free positive ions and negative electrons.

The forces that come into play between neutral molecules in a gas are weak and have short range, while in a plasma there arise electrostatic forces that are stronger and have a long range. In a gas it is primarily mass-motions that may give rise to turbulence, but in plasmas electrical and magnetic forces can also contribute.

All languages are strikingly alike

It can often be difficult to learn new languages, but from the point of view of linguistics all languages are strikingly alike. "The different languages have so many common features that man's language ability must be innate," says Professor Jan Terje Faarlund.

"We know a great deal about the way in which language changes, but we don't know why the results turn out as they do. The linguistic theories in this area are insufficient," says Professor Jan Terje Faarlund.

Among the similarities between languages are the facts that all languages have nouns and verbs, and vowels and consonants. The factual content of a proposition in any language whatsoever can always be translated into any other language. "But what's even more important is the fact that all languages are built up hierarchically and have a structure in which several words are grouped together in phrases. The subject of a sentence may be a single word, as in "He will be coming soon", or a group of words, as in "The man with the tie will be coming soon". The first sentence can be turned into an interrogative sentence by placing the second word first: "Will he be coming soon?" while the second sentence must be changed into "Will the man with the tie be coming soon?" Everybody understands that the second sentence does not become a question by our moving *word* number two in the first sentence, but by our moving *group* number two. Things like this all human beings do quite correctly in all languages, and not even child language researchers have found examples of anybody's saying "Man the with the tie will be coming soon?" This ability to analyse sentences and sentence elements is deeply rooted in us – so deeply rooted that it must be innate," says Jan Terje Faarlund.

"If this language ability had not been innate, it would hardly have been possible for children to learn their mother tongue as quickly as they actually do. By about the age of four they have command of a system that's so complex that all the world's linguists haven't yet managed to describe it in full!" he adds.

Professor Faarlund hastens to make clear that the possibilities of translation between different languages have their limitations. "It's the factual meaning content that can be expressed in all languages, albeit with paraphrases. But it can be difficult to translate literary and poetic nuances.

Linguistics as natural science

If the human language capacity is innate, it is natural for linguistics to move in the direction of biology – and precisely this is a strong trend at the moment. "Certain branches of linguistics have come closer to the natural sciences and thus moved away from research in literature and culture. Modern linguistic theorists often compare their own subject with physics or biology, which may send cold shudders down the backs of more humanistically oriented linguists. But we can't ignore the fact that particularly biology at any rate offers many models and metaphors we can use in linguistics," says Jan Terje Faarlund.

For example, the individual languages may be described as parallels to the species in biology. "Linguistically speaking we say that two people speak the same language if they can understand each other, and in biology two individuals belong to the same species if they can mate with each other. But then there are grey areas both in biology and in linguistics. Even though Danes, Swedes and Norwegians understand one another, it is by no means certain that West Jutlanders and Swedish-speaking Finns understand one another. In biology there are many examples of the fact that animal species can mate with one another, but the offspring are not fertile," adds Professor Faarlund.

Linguistic mutations

In biology new species can arise through mutations, and in the same way a language can change through *reanalysis*. "In simple terms, reanalysis means that new generations can misunderstand or reinterpret linguistic expressions from the previous generation. This can lead to enormous changes over sufficiently long periods of time. The Old

Linguistic theory and grammatical change

■ The aim of this CAS project is to formulate new theories of language-internal conditions for grammatical change over time. This is to be achieved on the basis of empirical data from different languages and modern linguistic theory. Central to the project are those principles and mechanisms that underlie syntactic and morphological change. Such changes may have identifiable external causes, but as a rule they can only explain why a process of linguistic change took place – not why the result turned out as it did. The project is being headed by Professor Jan Terje Faarlund, Section for Scandinavian Languages and Literature at the UiO. Among the members of the group there are experts on Old Germanic Languages, Latin and Romance languages, Slavonic languages, Finno-Ugrian languages, Caucasian languages and American Indian languages.

Norse language that was spoken in Iceland after colonisation in 874 was originally the same as that spoken in mainland Norway, but subsequently they developed so far, each in its own direction, that the result was two different languages. This is a parallel to the fact that an original finch developed into many different species in the isolated Galapagos Islands, in the way that was described by Charles Darwin," says Jan Terje Faarlund.

"Physics and chemistry have also contributed models that linguists can use," Professor Faarlund adds. For example, the American researcher Mark C. Baker speaks of the *parameter* as an important and fundamental element in grammar, in much the same way as the atom is a fundamental element in chemistry. The innate and genetically determined language capacity that man is alone in possessing as a species, and which makes us able to learn languages, also called universal grammar, has a number of unspecified points where each language can choose its values, and such a point is called a parameter. An example of such a point is the Head Directionality Parameter, which decides whether a governed element comes before or after the governing word. Languages that have the verb after the object ("He the book took"), like Japanese and Turkish, have one value for this parameter, while languages that have the object after the verb ("He took the book"), like Norwegian and Swahili, have the opposite value.

How does language change?

When a language changes on account of reanalysis and other influences, both the vocabulary and the grammar may change. Professor Faarlund is heading the research project *Linguistic Theory and Grammatical Change* at the CAS, with the principal objective of formulating new theories of language-internal conditions for grammatical change over time.

"We can see inter alia that great changes have taken place in word order during the development from Old Norse to Modern Norwegian. The use of reflexive pronouns has also changed a great deal. A more general feature that concerns many languages is the fact that the number of cases is reduced with time. The original Indo-European languages had eight cases, and Proto-Germanic had six cases, while modern Norwegian has greatly reduced the use of cases.

"We know a great deal about the way in which language changes when social conditions change, and when different languages come into contact with one another, but we don't know *why* the results turn out as they do. This is something we want to take a closer look at at the CAS, because the linguistic theories there are in this area are insufficient. Quite simply we need new theories in order to understand language better as a human property. Thus we shall also be better able to understand what it means to be a human being," Jan Terje Faarlund believes.

Centre for Advanced Study

Centre for Advanced Study at the Norwegian Academy of Science and Letters is an independent foundation with a board appointed by the Academy, the Universities and Colleges Council and the Research Council of Norway. The intention is that the academic activity at the CAS shall be recognised as achieving the highest international standard and thereby contributing to raising the quality of basic and interdisciplinary research in Norway. The Centre's academic activity is of a long-term nature and is to be permanent and academically independent vis-à-vis political and economic influences and the influence of research policy.

Outstanding researchers from Norway and abroad are invited for one-year stays to engage in research in the Centre's premises in the Academy's villa in Drammensveien in Oslo.

Each year the activity is organised in three research groups, each with from six to ten members whose affiliation is long-term. In addition come numerous researchers who spend shorter periods conducting research. Each group is planned and organised around a unifying theme and headed by one or more outstanding researchers.

The groups are chosen from each of the following three areas:

- The Humanities / Theology
- Social Science / Law
- Natural Science / Medicine / Mathematics

The Centre is exclusively a basic research institution where the participants have no other obligations than their own research. The Centre is administered by a permanent staff of four and was officially opened in 1992.

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The Centre with more co-operating partners

The Centre for Advanced Study has expanded the number of co-operating research institutions by 50 per cent, now that the Norwegian School of Economics and Business Administration and the Agricultural University of Norway have become members on a par with the four universities. “It may well be appropriate to invite even more institutions in the relatively near future,” says Scientific Director Willy Østreng.

“This expansion is a natural follow-up of what the idea was when the Centre for Advanced Study (CAS) was established in 1989, and this is embodied in our Articles of Association. The Centre shall be a joint measure and constitute a joint platform for the most weighty basic research communities in Norway. The Norwegian School of Economics and Business Administration (NHH) and the Agricultural University of Norway (NLH) are already heavy contributors within those fields of research that we cover at the CAS, and the new co-operation can be expected to provide us with more nominations and keener competition between the researchers who want to come here,” Willy Østreng explains.

The new co-operation agreements have been designed according to the same model as the existing agreements. Researchers who receive an offer from the CAS, after a thorough process of international evaluation, are given among other things an extra period of research leave in addition to the period they can otherwise earn in their respective research institutions.

The extension of this co-operation does not mean that more research groups will be established at the CAS in the first instance. “But we most certainly don’t discount the possibility that we may extend our activity at a later date,” Willy Østreng puts in. “It may also be natural to invite Stavanger College to take part in co-operation when it becomes a university in the near future. There are also several other weighty basic research communities that can be interesting co-operating partners.”

Welcome recognition

“We took the invitation from the CAS as welcome recognition of our academic community, and it was a simple matter to make the decision that we should like to join in,” says Rector Per Ivar Gjærum at NHH. “The framework of conditions for those researchers who come to the CAS is well suited to creating research of a high international standard. We both hope and believe that many NHH researchers will take part in the competition for an in-depth year at the Centre,” he adds.

An important contribution

“The CAS is doing an important job by focusing on basic research in Norway. We have had co-operation with the CAS before, and those researchers who have been there sent back very favourable reports. Now we are extending our co-operation in the sense that we shall also be involved in shaping the agenda for which research subjects are to be prioritised,” says Rector Knut Hove at NLH.

Incidentally, NLH is in the midst of a process of changing its status from that of a specialised college and of becoming a university. Everything seems to suggest that its new name will be the Norwegian University of Life Sciences.

Photo: NHH

“The invitation from the CAS was welcome recognition of our academic community,” says Rector Per Ivar Gjærum at NHH.

Photo: NLH, Håkon Sparre

“The CAS is doing an important job by focusing on basic research in Norway,” says Rector Knut Hove at NLH.

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Editor-in-chief: Willy Østreng
Editor: Bjarne Røsjø, Faktotum AS
Design: Faktotum as/dEDBsign/Ketill Berger
Printed by: Comitas AS
Circulation: 11,000 (Norwegian), 1000 (English)

The CAS Newsletter appears twice a year and is intended to provide information on the activities at the Centre and to create closer contact between the research communities. Articles in the Newsletter may be reproduced only with the agreement of the Editor-in-chief.

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ISSN 1503-4232